Abstract

Processing Analog Signals With Respect to
Timing of Related Rotary Parts

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Vibration signals (20, 21) are filtered and integrated (26) and converted to digital signals (41), resolved into orthogonal components (82, 180, 185; 96, 140, 145) of angles (81, 95) related to rotary components (43, 90). The pulse frequency of a stream of input pulses from the rotary components is multiplied (45, 92) by 2^n, by inserting (32) a pulse for each $1/2^n$ fraction (26, 28, 31) of the period (11, 15) following the preceding pulse. The averaging (192, 205; 152, 165) of the sums (189,; 149) of the squares (182, 187; 147, 142) of the orthogonal components is started leaving enough time for maximum deceleration at current speeds. Conflict in use of A/D (41) is resolved by registering the output (123; 124) in both channels. Square wave signals (23) are used for built-in test interleaved with signal processing. Non-integer pulses per revolution are accommodated with a counter (95) that counts modulo-one-bit-higher than a small integer multiple of a number close to the non-integer number.